Listing of Claims

1. (Previously Presented) A method for producing a hardened profiled structural part from a hardenable steel alloy with cathodic corrosion protection, comprising:

applying a coating to a sheet made of a hardenable steel alloy, wherein the coating comprises zinc, and the coating further comprises one or several elements with affinity to oxygen in a total amount of 0.1 weight-% to 15 weight-% in relation to the total coating;

subsequently roller-profiling the coated sheet steel in a profiling device, so that the sheet tape is formed into a roller-formed profiled strand;

thereafter heating the coated sheet steel, at least in part and with the admission of atmospheric oxygen, to a temperature required for hardening, and heating the coated sheet steel to a structural change required for hardening; wherein a skin made of an oxide of the element(s) with affinity to oxygen is formed on the surface of the coating; and

after sufficient heating, cooling the sheet, wherein the rate of cooling is set in such a way that hardening of the sheet alloy is achieved.

2. (Previously Presented) The method in accordance with claim 1, comprising welding the profiled strand, which was profiled in a profiling installation, in a downstream-located welding device.

3. (Previously Presented) The method in accordance with claim 1, comprising cutting the profiled strand into profiled strand sections prior to heating the profiled strand to the temperature required for hardening.

4. (Previously Presented) The method in accordance with claim 3, comprising heating the profiled strand or the profiled strand sections, prior to being heated to the temperature required for hardening, in a heating step to a temperature that makes possible the partial formation of iron-zinc phases in the coating, and maintaining the profiled strand or the profiled strand sections at this temperature.

5. (Previously Presented) The method in accordance with claim 3, comprising providing holes, cutouts, punched-out places and/or a required perforation pattern in the profiled strand or the profiled strands sections, prior to or following profiling and/or prior to or following the cutting to size, and prior to heating to the temperature required for hardening,.

6. (Previously Presented) The method in accordance with claim 1, comprising heating the profiled strand or the profiled strand sections to a temperature of 850°C to 950°C at a heating rate of 50°C to 100°C per second, and maintaining the profiled strand or the profiled strand sections at this temperature for at least 5 seconds, and cooling the profiled strand or the profiled strand sections at a cooling rate of 25°C to 45°C per second.

7. (Previously Presented) The method in accordance with claim 1, comprising, in the course of heating, maintaining the profiled strand or the profiled strand sections at 500°C to 600°C for at least 10 seconds, and subsequently further heating the profiled strand or the profiled strand sections.

8. (Previously Presented) The method in accordance with claim 1, comprising heating the profiled strand and/or the profiled strand sections inductively and/or by convection and/or by radiation.

9. (Previously Presented) The method in accordance with claim 1, comprising cooling the sheet in water, wherein a large volume of water is conducted at a very low pressure to the structural component to be hardened.

10. (Previously Presented) The method in accordance with claim 1, wherein magnesium and/or silicon and/or titanium and/or calcium and/or aluminum and/or manganese and/ or boron are used in the mixture as elements with affinity to oxygen.

11. (Previously Presented) The method in accordance with claim 1, comprising applying the coating using a hot-dip galvanization process, in which a mixture of substantially zinc with the element(s) with affinity to oxygen is used.

12. (Previously Presented) The method in accordance with claim 1, comprising applying the coating electrolytically.

13. (Previously Presented) The method in accordance with claim 12, wherein in the course of the electrolytic coating first a zinc layer is deposited, and thereafter the element(s) with affinity to oxygen is (are) deposited on the applied zinc coating in a second step.

14. (Previously Presented) The method in accordance with claim 12, comprising initially electrolytically depositing a zinc coating on the surface of the sheet, and subsequently applying a coating of the elements(s) with affinity to oxygen to the zinc surface.

15. (Previously Presented) The method in accordance with claim 14, comprising applying the element(s) with affinity to oxygen by vapor deposition or other suitable coating processes.

16. (Previously Presented) The method in accordance with claim 1, wherein 0.2 weight-% to 5 weight-% of the elements with affinity to oxygen are used.

17. (Previously Presented) The method in accordance with claim 1, wherein 0.26 weight-% to 2.5 weight-% of the elements with affinity to oxygen are used.

18. (Previously Presented) The method in accordance with claim 1, wherein aluminum is substantially employed as the element with affinity to oxygen.

19. (Previously Presented) The method in accordance with claim 1, wherein the coating mixture is selected in such a way that in the course of heating the layer forms a surface oxide skin made of oxides of the elements with affinity to oxygen and the coating forms at least two phases, wherein a zinc-rich phase and an iron-rich phase are formed.

20. (Previously Presented) The method in accordance with claim 19, wherein the iron-rich phase is embodied to have a ratio of zinc to iron of at most 0.95 ($Zn/Fe \leq 0.95$), and the zinc-rich phase a ratio of zinc to iron of at least 2.0 ($Zn/Fe \geq 2.0$).

21. (Previously Presented) The method in accordance with claim 19, wherein the iron-rich phase has a ratio of zinc to iron of approximately 30:70, and the zinc-rich face is embodied with a ratio of zinc to iron of approximately 80:20.

22. (Previously Presented) The method in accordance with claim 19, wherein the layer contains individual areas with zinc proportions > 90% zinc.

23. (Previously Presented) The method in accordance with claim 1, wherein the coating is formed in such a way that, at a thickness of 15 μm, it develops a cathodic protection effect of at least 4 J/cm^2 after heating.

24. (Previously Presented) The method in accordance with claim 1, comprising coating the sheet with the mixture of zinc and the element(s) with affinity to oxygen during passage of the sheet through a liquid metal bath at a temperature of 425°C to 690°C and subsequently cooling the coated sheet.

25. (Previously Presented) The method in accordance with claim 1, comprising coating the sheet with the mixture of zinc and the element(s) with affinity to oxygen during passage of the sheet through a liquid metal bath at a temperature of 440°C to 495°C and subsequently cooling the coated sheet.

26. (Previously Presented) The method in accordance with claim 1, comprising inductively heating the sheet.

27. (Previously Presented) The method in accordance with claim 1, comprising heating the sheet in a radiation furnace.

28. (Previously Presented) The method in accordance with claim 1, comprising forming and hardening the structural component in a roller forming installation, wherein the coated sheet is heated, at least in parts, to the austenizing temperature, is subsequently roller-formed prior to, during and/or after this and, following the roller forming, is cooled at a rate of cooling which causes hardening of the sheet alloy.

29. (Withdrawn) A corrosion-protection layer for sheet steel that is subjected to a hardening step, in particular for roller-formed profiled elements wherein, after having been applied to the sheet steel, the corrosion-protection layer is subjected to a heat treatment with the admission of oxygen, the corrosion-protection layer comprising:

zinc; and

one or more elements with affinity to oxygen in a total amount of 0.1 weight-% to 15 weight-% in relation to the entire coating;

wherein the corrosion-protection layer has on its surface an oxide skin comprising oxides of the one or more elements with affinity to oxygen, and the coating forms at least two phases including a zinc-rich phase and an iron-rich phase.

30. (Withdrawn) The corrosion-protection layer in accordance with claim 29, wherein the corrosion-protection layer comprises magnesium and/or silicon and/or titanium and/or calcium and/or aluminum and/or boron and/or manganese as elements with affinity to oxygen.

31. (Withdrawn) The corrosion-protection layer in accordance with claim 29, wherein the corrosion-protection layer was applied using a hot-dip galvanizing method.

32. (Withdrawn) The corrosion-protection layer in accordance with claim 29, wherein the corrosion-protection layer was applied using an electrolytic deposition method.

33. (Withdrawn) The corrosion-protection layer in accordance with claim 32, wherein the corrosion-protection layer was created by electrolytic deposition of substantially zinc and simultaneously one or several elements with affinity to oxygen.

34. (Withdrawn) The corrosion-protection layer in accordance with claim 32, wherein the corrosion-protection layer was initially created using electrolytic deposition of substantially zinc and subsequently using vapor deposition, or application by other suitable methods, of one or several elements with affinity to oxygen.

35. (Withdrawn) The corrosion-protection layer in accordance with claim 29, wherein the one or more elements with affinity to oxygen are contained in a total amount of 0.02 to 0.5 weight-% in relation to the entire coating.

36. (Withdrawn) The corrosion-protection layer in accordance with claim 29, wherein the one or more elements with affinity to oxygen are contained in a total amount of 0.6 to 2.5 weight-% in relation to the entire coating.

37. (Withdrawn) The corrosion-protection layer in accordance with claim 29, wherein the element with affinity to oxygen consists essentially of aluminum.

38. (Withdrawn) The corrosion-protection layer in accordance with claim 29, wherein the iron-rich phase has a ratio of zinc to iron of at most 0.95 ($Zn/Fe \leq 0.95$), and the zinc-rich phase a ratio of zinc to iron of at least 2.0 ($Zn/Fe \geq 2.0$).

39. (Withdrawn) The corrosion-protection layer in accordance with claim 29, wherein the iron-rich phase has a ratio of zinc to iron of approximately 30:70, and the zinc-rich phase has a ratio of zinc to iron of approximately 80:20.

40. (Withdrawn) The corrosion-protection layer in accordance with claim 29, wherein the layer contains individual areas with zinc proportions > 90% zinc.

41. (Withdrawn) The corrosion-protection layer in accordance with claim 29, wherein, at a thickness of 15 μm, the coating has a cathodic protection effect of at least 4 J/cm^2.

42. (Withdrawn) The corrosion-protection layer in accordance with claim 29, wherein the corrosion-protection layer is applied to a hardened profiled structural element made of a hardenable steel alloy.

43. (Withdrawn) The corrosion-protection layer in accordance with claim 42, wherein the structural element is formed out of a cold- or hot-rolled steel tape of a thickness of > 0.15 mm and within the concentration range of at least one of the alloy elements within the following limits in weight-%:

Carbon up to 0.4
Silicon up to 1.9
Manganese up to 3.0
Chromium up to 1.5
Molybdenum up to 0.9
Nickel up to 0.9
Titanium up to 0.2
Vanadium up to 0.2
Tungsten up to 0.2
Aluminum up to 0.2
Boron up to 0.01
Sulfur 0.01 max.
Phosphorus 0.025 max
the rest iron and impurities.